PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements relating to High-pressure Grease Guns.

Communication from DUPLO GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, of Wiesbaden, Germany, a company organised under the laws of the German Republic.

I, ALFRED ERNEST WHITE, C.I.Mech.E., Fellow of the Chartered Institute of Patent Agents, a subject of the King of Great Britain, of the firm of White, Langner, Stevens & Parry, of Jessel Chambers, 88—90, Chancery Lane, London, W.C. 2, Chartered Patent Agents, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to high-pressure grease guns having a grease receiving cylinder and a screw-operated pressure piston for forcing the grease through a telescoping high-pressure discharge conduit into the bearings requiring lubrication.

According to the present invention the grease is contained in a collapsible grease tube which has a grease-tight exit-connection with the discharge conduit of the gun and fits in and is supported laterally by the gun cylinder so as to preserve its cylindrical shape while being crushed by endwise pressure from the gun piston. When the tube is empty it is of course removed and replaced by a fresh full one. The tube not only receives full lateral support while being collapsed but also end support at its exit by fitting against a similarly shaped head on the pressure piston, these parts being preferably substantially conical. The said grease tube has a grease-tight connection at its discharge end or neck with the grease discharging conduit of the cylinder, so that upon an axial movement of the pressure piston an axial pressure is exerted on the grease tube, whereby the same is axially crushed and the grease contained in it squeezed out of the grease gun without liability of grease entering into the interior and adhering to the walls of the grease gun cylinder. Preferably the rod of the pressure piston is itself constructed as the telescoping grease discharging conduit of the grease gun and operated by a wing-nut rotatably supported at the discharge end of the grease cylinder, so that the main portion of such cylinder offers a good grip to the hand of the operator, particularly at its end which faces the operator, when he exerts an endwise pressure on the grease gun, for telescoping the discharge conduit and expelling a grease portion, as will more fully appear hereinafter.

In the drawings illustrating a preferred embodiment of my invention:—

Fig. 1 is a central section of the grease gun ready for a grease discharge,

Fig. 2 is a side view, partly in section, illustrating the position of the parts of the grease gun after a partial collapse of the grease tube and after the discharge of a grease portion,

Fig. 3 is a central section of the discharge end of the telescoping conduit after the discharge of a grease portion and before the pressure piston has again been screwed down,

Fig. 4 is a side view illustrating the use of the grease gun for sucking-in and discharging a liquid,

Figs. 5 and 6 are side and plan views respectively of the suction nipple,

Fig. 7 is a side view,

Fig. 8 is a central section of a grease tube, the tube cap being removed,

Fig. 9 is a side view of an attachment nipple permitting the angular attachment of the grease gun to a lubricating nipple,

Fig. 10 is the same side view, the attachment nipple being shown in section,

Fig. 11 is a plan view of the attachment nipple, looking from below with regard to Figs. 9 and 10,

Fig. 12 is a central section of the attachment nipple.

The new high-pressure grease gun illustrated in the drawings comprises a cylinder 1 of sheet metal, having at its one end a substantially conical hood or cap 2 and being closed at its other end by a detachable cap or cover 3. Within the cylinder 1 the pressure piston 4 is arranged having a substantially conical shape and being carried by the lower end of a hollow screw spindle 5 co-operating

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with a thumb-nut 6 rotatably carried but held against endwise movement by cap 2, the spindle 5 thus constituting the operating rod of the pressure piston 4. At its piston-adjacent end, the hollow rod 5 is provided with an inner thread 7 corresponding to the thread of the neck 8 of a collapsible grease tube 9 (Figs. 7 and 8) having a cylindrical wall of metal foil the same diameter as the bore of cylinder 1. The top wall 10 of the grease tube 9 is of a substantially conical shape corresponding to the shape of cap 2 and pressure piston 4, the tube bottom 11 being formed by a wooden disc having a peripheral groove 12 into which the lower margin of the cylindrical wall of the tube 9 is drawn by a cord 13 or the like, the lower edge of the said wall being wrapped around the lower rim of disc 11. The grease tube is thus provided with a nondeformable bottom and will on account of its perfect support in and by the cylinder 1 not lose its cylindrical shape when being subjected to the axially directed pressure of piston 4.

The inner thread 7 of the hollow piston rod 5 is further used for the attachment of a discharge conduit 14 proper, having near its outer end one or a plurality of transverse discharge orifices 15 and being at its end closed by a transverse wall 16. Telescopically arranged upon the tube 14, having thus a rigid connection with the pressure piston 4, is a second conduit 17 having at its outer end a cone 20 provided with an outer screw thread 18 and a grease discharge orifice 19. The conduit 17 extends at its inner end into the hollow piston rod 5, as shown, and is retained on the said piston rod and on the discharge conduit 14 by any suitable means. The inner end of its bore is enlarged at 21 so as to constitute a space or chamber into which the end of conduit 14 extends, whereby the communication between the two members of the high-pressure discharge conduit is established. A spiral spring 22 surrounds the conduit 14 within the piston rod 5 and tends to keep the conduit 17 in its outer position as illustrated in Fig. 1.

The screw thread 18 of cone 20 can be used for attaching to the grease gun the suction nipple or member 24 illustrated in Figs. 4—6 and comprising a plurality of cylindrical flaps 25 and a bottom wall 26 having a central orifice 27. The flaps 25 may be smooth or have a screw thread corresponding to thread 18 of cone 20. The wall 27 is provided with a plurality of transverse recesses 29 as shown.

According to Figs. 9 and 10 the screw threads 9 and 10 may also be used for attaching the grease gun to a so-called attachment nipple permitting the grease discharge into otherwise inaccessible lubricating nipples. Such an attachment nipple comprises a metal member 30 having an angular bore 31 for the grease which at its one end passes into an enlargement 32 having an inner thread 33 by means of which the nipple may be screwed onto the thread 18 of cone 20.

34 is a lubricating nipple which is at an angle with relation to the grease gun when the same is used. The said nipple is closed by a spring pressed ball 35 and provided with an enlarged rim 36 at its upper end. The body 30 of the attachment nipple is at its one end provided with a forked portion 37 the gap of which corresponds to the outer diameter of nipple 34 below the rim 36 and above which a gap 38 is provided within which the rim 36 may be received if the attachment nipple is slid upon the lubricating nipple. The lower face of the body 30 is above the fork 37 recessed at 39 for receiving an anti-leakage leather gasket 40. This gasket is provided with a central perforation constituting the continuation of the downwardly extended portion of bore 31 and permits a grease-tight engagement of the attachment nipple to the lubricating nipple.

The new high-pressure grease gun operates as follows:—

In order to make the grease gun ready for use, the cylinder cap 3 is screwed off, whereupon the neck 8 of a grease tube 9 is screwed into the thread 7 of the hollow piston rod 5, whereby the substantially conical tube wall 10 makes contact with the conical lower surface of the pressure piston 4 and a grease-tight communication of the tube 9 and of the bore of the telescoping high-pressure discharge conduit 14—17 is established. After the tube 9 is thus introduced into the cylinder 1 and its neck attached to the conduit 14, the lower cylinder end is again closed by cap 3. The cylindrical wall of the tube 9 is now contacting with the inner surface of cylinder 1, its top wall is engaging with the pressure piston 4 and its bottom is resting on cap 3, so that the tube has a perfect outer support against the outwardly acting pressure exerted by the piston when the same is moved towards cap 3 and collapses the tube; the cylindrical shape of the creased tube 9 is preserved up to the final discharge of the grease contained therein.

If the introduction and attachment of the grease tube should present difficulties because of irregularities in contour of the cylindrical wall, the thumb-nut 6 is rotated until the pressure piston is sub-

stantially at the lower end of cylinder 1 (Fig. 1) so that the tube neck can be readily screwed-in. Once the tube neck has been screwed into the thread 7 and the tube wall 10 got its grease tight engagement with the pressure piston 4, the nut 6 is rotated in the opposite direction, so that the piston 4 is moved upwardly and the tube drawn into the interior of cylinder 1. The insertion of the tube can thus be effected without any axial or other pressure being exerted upon it that might result in an undue discharge of grease.

When a tube filled with grease has been introduced into the cylinder 1 and attached to the pressure piston 5 and grease is to be discharged, the thumb-nut 6 is again so rotated as to move the piston 4 towards cap 3. Since the tube 9 is now supported at its bottom portion by the tube bottom wall resting on cap 3 it is squeezed out by and in accordance with the piston movement whereby the cylindrical wall of the tube is axially collapsed while maintaining substantially its cylindrical shape as illustrated in Fig. 1. Grease is thus pressed into and through the conduit 14 and will eventually pass through the transverse orifice 15 into conduit 17 until it finally begins to discharge through orifice 19. The grease gun is now in readiness for discharging grease. If now a grease portion is to be discharged to a bearing 23 (Fig. 2) the cone 19 is held against the lubricating nipple and an endwise pressure is exerted on the cylinder 1 towards the lubricating nipple. This results in a shift of conduit 17 against the effect of spring 22 and with relation to conduit 14, until the cone 20 engages with the outer end of tube 5. The grease portion contained in the conduit 17 is thus expelled under high pressure.

Just at the beginning of the discharging movement of the telescoping conduit, the transverse wall 16 enters into the bore of conduit 17, whereby also the transverse orifices 15 are closed and the grease portion contained within the conduit 17 is separated from the grease within the grease tube 9 and the conduit 14. Upon continuation of the discharge movement the discharge pressure therefore only acts on the small quantity of grease filling the bore of conduit 17 beyond the transverse wall 16. This small quantity of grease very quickly reaches its condition of final compression, so that the highest possible discharge pressure can become effective and act on the grease portion to be discharged, long before the relative stroke possible between the conduit portions 14 and 17 is completed. The grease gun however also acts satisfactorily if the transverse orifices 15 and transverse wall 16 are omitted and a permanent direct communication of the telescoping conduits 14 and 17 is established. In this instance the discharge pressure acts on the total grease quantity within the grease gun.

As soon as the pressure on the cylinder 1 is released, the conduit 17 is returned by its spring 22 into the position according to Fig. 1, the grease then extending only up to the transverse wall 16 (Fig. 3) whereas the bore of member 17 is free from grease. A repeated grease discharge can accordingly be only effected after the spindle 5 has again been screwed down by means of the thumb-nut 6 and the bore of member 17 has again been filled with grease. The grease discharge is thus effected in definite or measured portions and after each discharge of a portion of grease the bore of the conduit 17 must be refilled by a corresponding rotation of the thumb-nut 6.

The fact that after each discharge of a grease portion the bore of member 17 is free from grease and that even upon a repeated endwise pressure on the grease gun no further grease discharge can be effected, as long as the movable conduit 17 has not been refilled, may be used in the application of the gun to the sucking-in and discharging of liquids, for example of purifying liquids, while the conduit 14 and the tube 9 are still filled with grease. To this end I arrange the suction nipple 24 illustrated in Figs. 5 and 6. If a liquid is to be sucked-in, one applies the nipple to the cone 20 while the bore of member 17 is still free from grease, by sliding the nipple flaps 25 frictionally over the cone 20 or by screwing the nipple with its inner thread, if any, upon the cone thread 18 so that the bore 18 constitutes the continuation of the suction nipple perforation 27 (Fig. 4). If now the grease gun having the suction nipple attached to its discharge end is introduced into a container 28 containing a suitable liquid, such as petroleum, and the grease gun is put under endwise pressure, as illustrated in Fig. 4, it will upon release of such pressure and on the return of member 17 under the action of spring 22 suck-in liquid over the groove 29 of the bottom wall 26 and over the orifice 27 into the bore of member 17. After removal of the suction nipple the liquid thus sucked-in can be discharged under high-pressure by a further compression of the telescoping discharge conduit or endwise pressure on the grease gun.

According to Figs. 9—12 the thread 18

may also be used for attaching an attachment nipple in order to permit a grease discharge into an otherwise inaccessible lubricating nipple. If the immediate application of the discharge conduit to the nipple 34 meets with difficulties the attachment nipple is applied to the lubricating nipple by the sliding fork 37 over the nipple neck, so that the nipple 36 enters into cap 38 and the leather gasket engages with the upper surface of rim 36 and prevents leakage. One can now introduce the cone 20 of the grease gun into the enlarged bore 32 whereby, on account of the conical shape of member 20 a grease-tight fit is produced between the discharge conduit and the attachment nipple. This grease-tight fit is particularly obtained if in accordance with the drawing a screw-threaded engagement is provided between the attachment nipple and the discharge cone of the grease gun. Such a rigid connection is also of advantage because the application of the grease gun and of the attachment nipple can then be effected in one operation, the attachment nipple being at first rigidly connected with the grease gun whereby it can be rotated around the axis of the lubricating nipple by means of the grease gun so as to properly adjust the grease gun and the attachment nipple connected with it.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed (as communicated to me by my foreign correspondents), I declare that what I claim is:—

1. A high-pressure grease gun characterised by the fact that the grease is contained in a collapsible grease tube which has a grease tight exit-connection with the discharge conduit of the gun and fits in and is supported laterally by the gun cylinder so as to preserve its cylindrical shape while being crushed by endwise pressure from the gun piston.

2. A high-pressure grease gun according to Claim 1 characterised by the fact that the pressure piston acts on the top wall of the collapsible tube and is of substantially conical shape corresponding to a similar formation of the said top wall.

3. A grease gun according to Claims 1 and 2 characterised by the fact that the discharge conduit adapted to have a screwed connection with a neck of a grease tube forms the hollow piston rod of the pressure piston which is moved by a thumb-nut rotatably carried at the discharge end of the cylinder.

4. A high-pressure grease gun as claimed in Claims 1—3 characterised by the fact that the rod of the pressure piston is constructed as a telescoping high-pressure discharge conduit and arranged at its outer end for receiving a suction nipple or an attachment nipple.

5. A high-pressure grease gun according to Claim 1, characterised by the fact, that a hollow spindle constituting the rod of the pressure piston is rigidly connected beyond the point of attachment of the grease tube exit with the discharge conduit so as to move simultaneously therewith and constitutes together with the said discharge conduit a guide for a telescoping discharge conduit member and a controlling spring therefor.

6. A high-pressure grease gun according to Claims 4 and 5 characterised by the fact that the two members of the discharge conduit communicate with each other by a laterally deviating grease passage and that one of the discharge conduit members is constructed as a discharge piston adapted to interrupt the communication between the grease portion to be discharged and the grease contained in the grease tube at the beginning of the discharging operation.

7. A high-pressure grease gun according to Claim 6 characterised by the fact that the conduit communicating with the grease tube extends at its outer end into the enlarged bore of the telescoping discharge conduit and is adapted at its end constructed as a diaphragm to close the bore of the telescoping discharge conduit member at the beginning of the discharging operation.

8. A high-pressure grease gun according to Claim 1 characterised by the fact that the grease tube is provided with a cylindrical wall of metal foil and a non-deformable bottom member preferably of non-metallic material.

9. A high-pressure grease gun according to Claim 9 characterised by the fact that the bottom member of the grease tube is constituted by a solid disc having a peripheral groove into which the lower marginal portion of the cylindrical wall of the tube is drawn by means of a cord.

10. For use in a grease gun of the cylinder and pressure piston type according to Claim 1, a removable grease tube of collapsible material.

11. A high-pressure grease gun constructed arranged and adapted to operate substantially as hereinbefore described with reference to the Figures 1 to 6 of the accompanying drawings for the purposes specified.

12. For use with a grease gun of the cylinder and pressure piston type according to Claim 1, a collapsible grease tube substantially as hereinbefore described with reference to Figures 7 and 8 of the

accompanying drawings for the purposes specified.

Dated the 14th day of October, 1926.
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Chartered Patent Agents,
Jessel Chambers, 88—90, Chancery Lane,
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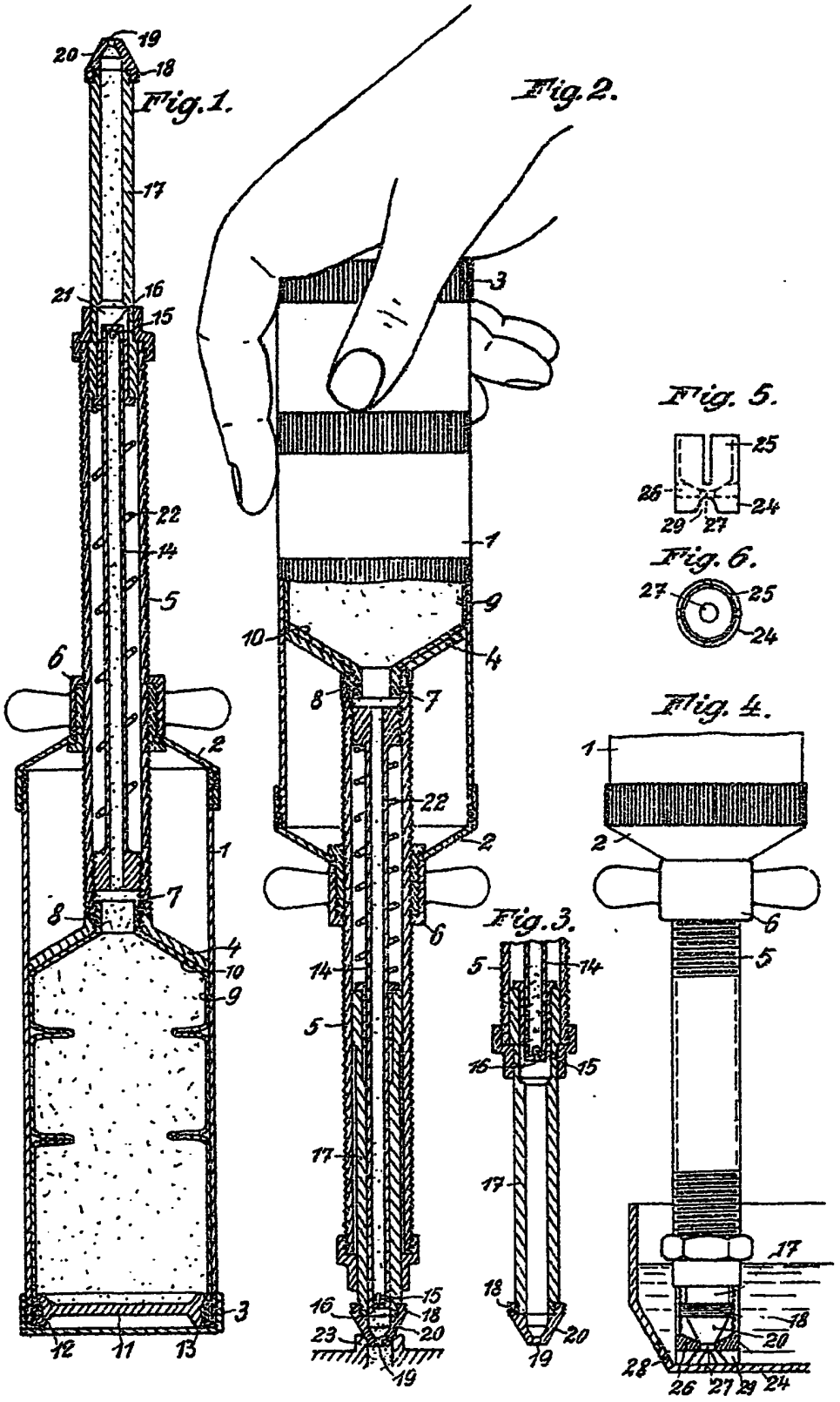

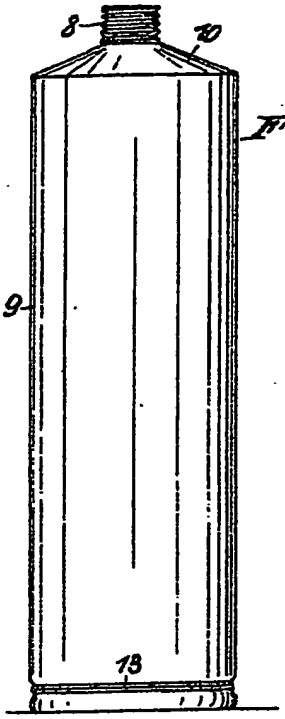

Fig. 7.

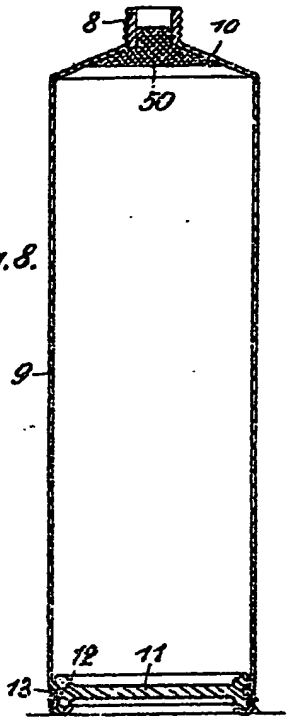

Fig. 8.

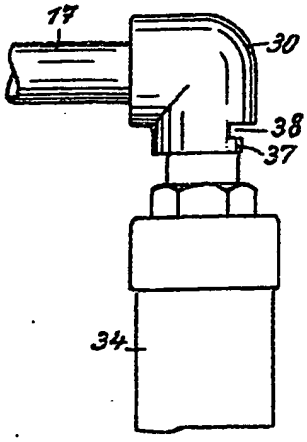

Fig. 9.

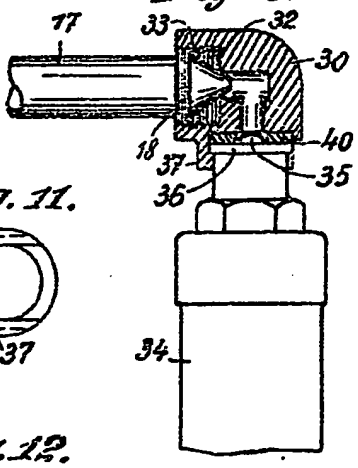

Fig. 10.

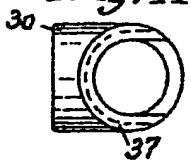

Fig. 11.

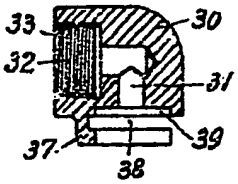

Fig. 12.

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[This Drawing is a reproduction of the Original on a reduced scale]

Fig. 1.

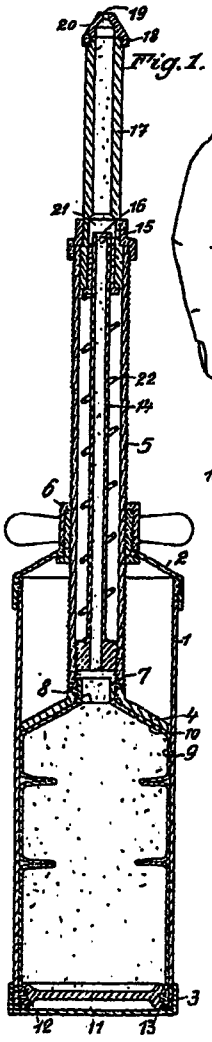


Fig. 2.

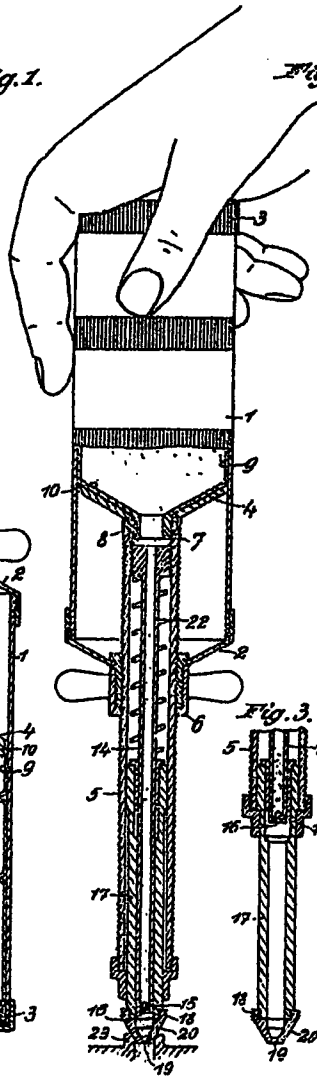


Fig. 5.

Fig. 6.

Fig. 4.

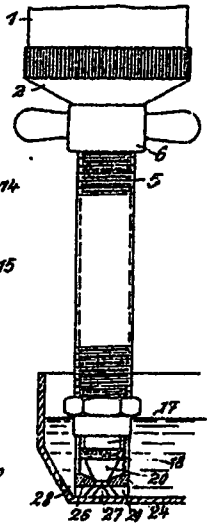


Fig. 3.

Fig. 7.

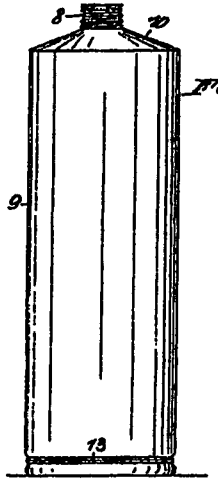


Fig. 8.

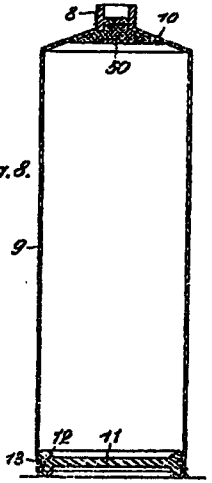


Fig. 9.

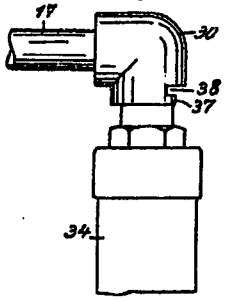
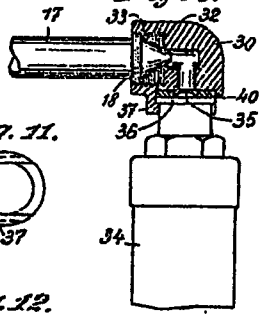


Fig. 10.



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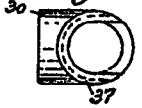

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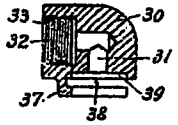

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